

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Comments on the Environmental/Ecological Threat Evaluation: 12th Street
Landfill/Dump Site

DATE: March 29, 2000

FROM: Jeffrey G. Tuttle
Technical Support Section

TO: Michael Towle (3HS 31)
On-Scene Coordinator

This memorandum is in response to your request to provide comments on the November 1999 request for an Environmental/Ecological Threat Evaluation, for the 12th Street Landfill/Dump Site, located in Wilmington, Delaware. EPA, NOAA, and FWS members of the BTAG have reviewed this document and offer the following comments.

General Comments

The request by the EPA OSC was to provide an evaluation of the threat posed by an area of buried drums and contaminated soil and sediment along the Brandywine River in Wilmington, Delaware. Site contaminant concentrations do exceed both BTAG and other common ecological screening values (see Tables 1, 2, and 3). Some of the site specific contaminant concentrations are eight orders of magnitude greater than screening values. This suggests that there is potential risk from contaminants in soils, sediment, and groundwater to ecological receptors.

Based on a discussion with BTAG, Michael Towle indicated he needed immediate support for stabilizing the river bank at this site and that support for a removal action would be needed at a later date. This letter is in support of stabilizing the river banks at this site. In order for BTAG to assist with determining the need for removal of soils or sediments, more information will be needed to generate preliminary removal goals (PRGs) or cleanup levels. BTAG will need to work with Mike to develop these PRGs. In addition, BTAG would like to schedule a site visit.

The information provided did not contain the entire raw data set, but only a summary (3-4 inorganics and up to 10 organics). We recommend that the entire data set be made available for review. This would help in reducing the uncertainty that the contaminants provided in the summary are the only ones of ecological concern. For those contaminants where the site specific value does not exceed the detection limit, the detection limits need to be provided. The detection limits will be compared to the ecologically sensitive benchmarks to assist in determining potential ecological risk from TAL/TCL analytes. There is also some concern about the number of samples in each of these media and the resulting uncertainty in data interpretation.

AR100487

Some of the inorganic contaminant benchmarks are dependent upon site specific hardness (CaCO_3) and pH values. We recommend that this information be provided. In the absence of these data, site specific concentrations can still be compared to benchmarks, but there will be uncertainty in the interpretation of these results.

Results

A generally accepted way to screen data is to compare site values against an ecologically sensitive benchmark. In this case, the primary benchmark will be the EPA Region III BTAG screening table. This comparison produces a value normally referred to as a hazard quotient (HQ) and the formula is:

$$\text{HQ} = \text{Site specific concentration/ecological benchmark.}$$

If the HQ is equal to or greater than 1, there is potential for ecological risk. If the HQ is less than 1, there is potential for little or no risk. The more conservative the benchmark, the more certain that if a contaminant passes the screen, it means there is no risk. There is no association between the magnitude of the HQ and the severity of the risk posed.

Table 1 shows the site specific contaminant concentrations in surface soils, subsurface soils, drums, and ash material compared to the BTAG screening values. There were five surface soil samples, three subsurface soil samples, four drum samples, and three ash material samples. In general, Table 1 shows the HQs equal to or exceeding 1 for lead, zinc, phenol, pyrene, chrysene, benzo-a-pyrene, toluene, and barium in one or all of these media. There are at least three contaminants for which BTAG does not have a screening value (dibenzofuran, bis(2-ethylhexyl)phthalate, and 2-methylnaphthalene). In surface soils, the contaminants of potential concern (COPCs) include lead, zinc, pyrene chrysene and benzo-a-pyrene. In subsurface soils, the COPCs include lead, zinc, pyrene, chrysene and benzo-a-pyrene. In the drums, the COPCs include lead, zinc, phenol and toluene. In the ash material, the COPCs include lead, zinc, and barium.

Table 2 shows site specific sediment concentrations in sediment compared to BTAG screening values and some alternative screening values for both freshwater and marine waters. There were two sediment samples. For sediments, the data suggests that only the three inorganics (lead, arsenic, and zinc) are at concentrations which can cause potential risk for ecological receptors. At least two of the organics did not have a screening value in the BTAG table, so the potential risk from these is unknown.

Table 3 show site specific groundwater concentrations compared to BTAG ambient water quality criteria (AWQC) screening values. There was a single groundwater sample. This single sample suggests that lead, and zinc are potentially at concentrations that could cause risk to ecological receptors if this groundwater should reach surface waters. The majority of the organic compounds did not show a detection and three of these did not have a freshwater BTAG screening value.

Table 1. Concentrations (mg/kg) of summary contaminants in site surface soils, subsurface soils, drums, and ash material compared with USEPA Region III BTAG screening values.

	Surface	Subsurface		Ash	BTAG	HQ
Contaminant	Soil	Soil	Drums	Material	Screen	(Max.)
lead	4590 - 206,000	148 - 264,000	207 - 106,000	383 - 2570	0.01	264 x 10 ⁵
arsenic	24 - 117	16.2 - 29.4	5.1 - 19.7	8.9 - 26	328	0.3
zinc	1820 - 6120	1510 - 13,000	1490 - 13,600	776 - 13,400	10	1360
phenol	0.06 - 0.11	0.62	210	-	0.1	2100
dibenzofuran	-	0.05 - 0.085	470	-	NB	
pyrene	0.49 - 1.4	0.026 - 1.0	-	0.062	0.1	14
bis(2-ethyl-hexyl)phthalat	0.89 - 22	1.1 - 3.0	20 - 68	0.079 - 0.13	NB	
fluoranthene	0.39 - 1.2	0.071 - 0.91	-	-	0.1	
chrysene	0.26 - 0.9	0.062 - 0.61	-	0.065	0.1	9
2-methyl-naphthalene	0.02 - 0.062	0.13 - 1.3	58 - 710	-	NB	
benzo a pyrene	0.27 - 1.0	0.059 - 0.62	-	-	0.1	10
toluene	-	1.9	0.065 - 1200	-	0.1	12,000
barium	-	-	-	96.6 - 6270	440	14.25

NB = no benchmark

AR100489

Table 2. Contaminant concentrations (mg/kg) in sediment at the 12th Street Landfill/Dump Site.

		BTAG	Alternative Screen		HQ
Contaminant	Sediment	Screen	Freshwater	Marine	(BTAG)
lead	1120 - 8370	46.7	35 (TEL)	218 (ER-M)	179
arsenic	5.9 - 15.7	8.2	5.9 (TEL)	70 (ER-M)	1.9
zinc	153 - 1180	150	123 (TEL)	410 (ER-M)	7.9
phenol	0.049	0.42(AET)	0.48 (UET)	0.42 (AET)	0.1
dibenzofuran	-	NB			
bis(2-ethyl-hexyl) phthalate	0.028 - 1.0	1.3(AET)	7.5(UET)	1.3(AET)	0.77
fluoranthene	0.2	0.6	0.031(ARCs TEL)	5.1 (ER-M)	0.33
chrysene	0.16	0.384	26.8(ARCs TEL)	0.1(TEL)	0.42
2-methyl-naphthalene	-	0.07			
benzo (a) pyrene	0.17	0.43			0.4
toluene	-	NB			

NB = no benchmark

TEL = threshold effects level

ER-M = effects range median

UET = upper effects threshold

AET = apparent effects threshold

ARCs TEL = lowest ARCs *H. azteca* threshold effects level

Table 3. Contaminant concentrations (~g/L) in groundwater compared to USEPA Region III BTAG screening values for surface water.

Contaminant	Groundwater	BTAG Screen		HQ
		Freshwater	Marine	(Max.)
lead	5.3	3.2	5.1	1.7
arsenic	5.2	874	10	0.52
zinc	75.5	30	19	3.97
phenol	0.002	79	5.8	0.0003
dibenzofuran	-			
bis(2-ethylhexyl)-phthalate	-	30	360	
pyrene	-	NB	300	
fluoranthene	-	3980	16	
chrysene	-	NB	300	
2-methyl-naphthalene	-	NB	300	
benzo (a) pyrene	-		0.21ng/ml	
toluene	-	17000	1050	

Thank you for the opportunity to provide comments on the Environmental/Ecological Threat Evaluation. Please contact Peter Knight at (215) 814-3321, or Jeff Tuttle at (215) 814-3236 if you have any questions.

AR100491